



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 140  
Alexandria, Virginia 22313-1410  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,115	07/15/2003	David T. Jennings III	BRD021	8635

7580 12/18/2003

Thomas J. Brindisi, Esq.  
Suite B  
20 28th Place  
Venice, CA 90291

EXAMINER

BLACKNER, HENRY A

ART UNIT

PAPER NUMBER

3661

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/620,115

Applicant(s)

JENNINGS III, DAVID T.

Examiner

Henry A. Blackner

Art Unit

3641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(e). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory maximum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the minimum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned priority term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Information Disclosure Statement*

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

1. CEN Document. prCEN/TS 13763-27 (NMP 898/FABERG N 0090 D/E) E 2002-06-19, paragraph 20, line 12.

### *Drawings*

The drawings are objected to under 37 CFR 1.83(a) because they fail to show that pin 13 is grounded, figure 4, as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608 02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 18' (figure 2) and 21 (figure 3). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office

action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Specification*

The disclosure is objected to because of the following informality: In the phrase “flag indicates whether or not the device has been *been* detected on the bus”, paragraph 43 lines 4-5; suggest deleting the duplicate term “been”, for clarity.

Appropriate correction is required.

### *Claim Objections*

Claims 1-10, 14, and 20 are objected to because of the following informalities:

1. In regards to claim 1, the term “storage module”, line 6, was previously identified as a “*firing energy storage module*”
2. In regards to claims 2-9, the preamble “The device of claim”, should read as “The *pyrotechnic* device of claim”.
3. In regards to claim 6, the term “constant current module”, line 2, was previously identified as a “constant current *charging* module”.
4. In regards to claim 7, the term “detonator”, line 1, was previously identified as an “*electronic* detonator” and the term “constant current module”, line 2, was previously identified as a “constant current *charging* module”.
5. In regards to claims 8 and 9, the term “constant current module”, line 1, was previously identified as a “constant current *charging* module”.
6. In regards to claim 10, the term “device”, line 6, was previously identified as a “*pyrotechnic* device”.

7. In regards to claim 14, the term "detonators", line 1, was previously identified as an  
"electronic detonators".
8. In regards to claim 20, the term "module", line 2, was previously identified as a  
"constant current charging module".

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites the limitation "the current" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the current" in line 6. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States

Claims 1-17, 19, and 20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 5,460,093 to Prinz.

In regards to claim 1, Prinz clearly illustrates, a pyrotechnic device (10) comprising an igniter (18), a firing energy storage module (32) connected to the igniter, and a constant current charging module (54) connected to the storage module, in figures 1 and 4, column 2 lines 41-43, column 4 lines 16-28, lines 30-35, lines 37-48, lines 52-57, and lines 61-67, column 5 lines 1-7, column 6 lines 52-67, and column 7 lines 1-31.

In regards to claim 2, Prinz clearly illustrates, wherein the firing energy storage module is connected to the constant current charging module by a switch (58), in the rejection of corresponding parts of claim 1, above.

In regards to claim 3, Prinz clearly illustrates, wherein the firing energy storage module is connected to the igniter by a switch (34), in figure 4 and column 7 lines 15-31 and lines 34-37.

In regards to claim 4, Prinz clearly illustrates, wherein the firing energy storage module is a firing capacitor, in the rejection of corresponding parts of claim 1, above.

In regards to claim 5, Prinz clearly illustrates, wherein the pyrotechnic device is an electronic detonator, in the rejection of corresponding parts of claim 1, above.

In regards to claim 6, Prinz clearly illustrates, the device further comprises an ASIC (30) containing the constant current module, in the rejection of corresponding parts of claim 1, above.

In regards to claim 7, Prinz inherently illustrates, wherein the detonator is for use in a system of multiple detonators, and the constant current module is configured and/or programmed to limit the current to the firing capacitor to below an amount that could cause excessive voltage sagging in the system, in figure 1, column 1 lines 7-22, column 2 lines 41-43, column 6 lines 27-35, column 7 lines 44-47, column 8 lines 10-14, and column 10 lines 24-40.

In regards to claim 8, Prinz inherently illustrates, wherein the constant current module is further configured and/or programmed to limit current to below an amount that could result in inadvertent firing of the igniter, in the rejection of corresponding parts of claim 7, above.

In regards to claim 9, Prinz clearly illustrates, wherein the constant current module is further configured and/or programmed to activate in response to an arming command, in the rejection of corresponding parts of claim 7, above.

In regards to claim 10, Prinz clearly illustrates, a method of charging a pyrotechnic device comprising the following steps: providing at least one pyrotechnic device (10) with an igniter (18) and a firing energy storage module (32), and charging the firing energy storage module in preparation for firing of the device, wherein the current to the firing energy storage module is limited, in figures 1 and 4, column 2 lines 41-43, column 4 lines 16-28, lines 30-35, lines 37-48, lines 52-57, and lines 61-67, column 5 lines 1-7, column 6 lines 27-35 and lines 52-67, column 7 lines 1-31 and lines 44-47, and column 10 lines 24-40.

In regards to claim 11, Prinz inherently illustrates, wherein the step of charging is a constant-current, rail-voltage limited charging process, in the rejection of corresponding parts of claim 10, above.

The fundamental method of charging a capacitor involves: that upon applying a voltage to a capacitor, 1) the current draw of the capacitor is held at a constant value and that the stored voltage is increased at a linear rate and 2) as the stored voltage approaches the required voltage value and is held constant, the current draw of the capacitor decreases.

In regards to claim 12, Prinz inherently illustrates, a method which further comprises the step of establishing a system including multiple pyrotechnic devices each having an igniter and a

firing energy storage module, the system including a master device (14) and a bus (L1, L2) connecting the master device to the pyrotechnic devices, in the rejection of corresponding parts of claim 10, above.

In regards to claim 13, Prinz inherently illustrates, wherein the system is an electronic blasting system, the master device is a blasting machine, the pyrotechnic devices are electronic detonators, and the firing energy storage modules are firing capacitors, in the rejection of corresponding parts of claim 10, above.

In regards to claim 14, Prinz clearly illustrates, wherein each of the detonators includes a constant current charging module (54), in the rejection of corresponding parts of claim 10, above.

In regards to claim 15, Prinz clearly illustrates, a method, which further comprises the step of issuing an arming command from the blasting machine, the constant current charging module configured and/or programmed to activate in response to the arming command, in the rejection of corresponding parts of claim 10, above.

In regards to claim 16, Prinz clearly illustrates, wherein the firing capacitor is connected to the constant current charging module by a switch (58), in the rejection of corresponding parts of claim 10, above.

In regards to claim 17, Prinz clearly illustrates, wherein the firing capacitor is connected to the igniter by a switch (34), in figure 4 and column 7 lines 15-31 and lines 34-37.

In regards to claim 19, Prinz clearly illustrates, a constant current charging module (54) for use in an electronic detonator (10), in figures 1 and 4, column 4 lines 16-28, lines 30-35, lines



37-48, lines 52-57, and lines 61-67, column 5 lines 1-7, column 6 lines 27-35 and lines 52-67, column 7 lines 1-31 and lines 44-47, and column 10 lines 24-40.

In regards to claim 20, Prinz clearly illustrates, wherein the module is configured and/or programmed to respond to an arming command issued from a blasting machine (14) by charging a firing capacitor (32) in the electronic detonator with a constant-current, rail-voltage limited process, in the rejection of corresponding parts of claim 19, above.

The fundamental method of charging a capacitor involves: that upon applying a voltage to a capacitor, 1) the current draw of the capacitor is held at a constant value and that the stored voltage is increased at a linear rate and 2) as the stored voltage approaches the required voltage value and is held constant, the current draw of the capacitor decreases.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prinz in view of Jullian

Prinz discloses the claimed invention, see rejections of claims 10-17, above, but does not disclose that the firing capacitors are charged in a staggered fashion. Jullian teaches in figures 1-4, 7, and 8, column 3 lines 30-42 and lines 55-68, column 4 lines 1-6 and lines 25-36, column 5 lines 14-22, lines 40-54, and lines 59-62, column 6 lines 1-20, column 9 lines 3-17, that a blasting system (10) which is comprised of a blasting galvanometer "logger" (18), a blasting

machine (20), and a plurality of programmable electronic detonators (EBC1-EBC3), with the capability of arming and firing individual electronic detonators or a plurality of electronic detonators. The "logger" is used to test whether an electronic detonator is operational, setting a unique address to the electronic detonator, and setting a detonation delay. The "logger" supplies power to the electronic detonators for the purpose of communication. The blasting machine is used to perform functions with respect to the detonation of the electronic detonators, specifically transmission of a security code, arming, calibration, and firing. The blasting machine supplies power to the electronic detonators for the purpose of communication and charging an igniter power supply (C2), for ultimately detonation of the electronic detonator and is capable of arming and firing an individual electronic detonator or a plurality of electronic detonators. The electronic detonator is comprised of an integrated circuit (IC) and electronic components required to communicate with either the "logger" or the blasting machine, an Encoder/Decoder, a ROM, an EEPROM, a Clock Signal Generator, a Calibration Circuit, a Calibration Counter, a Firing Circuit, a Delay Counter, and an Address Counter.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ Jullian's method of employing a blasting system comprising a blasting galvanometer "logger", a blasting machine, and programmable electronic detonators, in order to achieve the desired effect of the capability of identifying individual electronic detonators with a unique address, which would allow a blasting machine to arm and fire individual electronic detonators or a plurality of electronic detonators.

*Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following documents show the state of the art in the field of Constant-Current, Rail-Voltage Regulated charging Electronic Detonators.

U.S. Patent No. 6,571,712 B2 to LeBaudy et al.

U.S. Patent No. 6,418,853 B1 to Duguet et al.

U.S. Patent No. 6,166,452 to Adams et al.

U.S. Patent No. 6,000,338 to Shann

U.S. Patent No. 5,894,103 to Shann

U.S. Patent No. 5,214,236 to Murphy et al.

U.S. Patent No. 4,674,047 to Tyler et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Henry A. Blackner whose telephone number is 703-305-4799. The examiner can normally be reached on 09:15 - 17:45.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 703-306-4198. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9326.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-5771.

hab  
11 December 2003



MICHAEL J. CARONE  
SUPERVISORY PATENT EXAMINER